

3-5 Life Science
3-5 Nature of Science



Southern Nevada Regional Professional Development Program

Terrariums Unit

*(This lesson was modified from a lesson found at:
<http://www.instructorweb.com/lesson/maketerrarium.asp>)*

INTRODUCTION

Learning about environments is a crucial part of our daily lives. We depend on all organisms, both plants and animals, to survive from day to day.

WHERE'S THE SCIENCE?

Our **environment** is everything that surrounds us and influences an organism. An **environmental factor** is one part of an environment that can be living or non-living. There is a relationship that exists between a number of environmental factors and how well organisms grow. For example, the growth of a plant depends on how much water it gets or how much sunlight. Environments are constantly changing over time. A **terrarium** is a mini garden in an enclosed container. The container used must be clear to allow sunlight to pass through and aid the plants in photosynthesis. The bottom layer of a terrarium usually consists of sand and pebbles used for filtration. Some more sophisticated terrariums also contain a small amount of charcoal, also used for filtration and purification of the water system inside. On top of the rock material is a layer (usually 2-3 centimeters thick) of soil. A variety of plants can be grown successfully in terrariums. In cooler environments the following plants will thrive; mosses, lichens, bloodroot, wood ferns, and violets.

In warmer environments typically what is grown includes begonias, croton, peperomia, creeping fig, Chinese evergreen, and other tropical plants. In a closed terrarium, the water will cycle back to the plants, therefore watering is only necessary roughly every month. Various animals can be introduced to the terrarium and thrive. A proper food source must be readily available in the terrarium for the introduction of an organism to be successful.

MATERIALS

(per group)

- 1 clear 6 Liter or larger container
- 1 mini spoon (www.deltaeducation.com)
- 2 plastic cups
- 2 sticky notes
- 1 1-liter container
- 1 100 mL beaker
- 2 liters of potting soil
- 1 cup of pebbles
- Variety of seeds (radish, corn, barley, clover)
- 1 piece of plastic wrap
- Insects or snails
- Hand lenses
- Small clear plastic cups
- Science Notebooks



PROCEDURES

Lesson One

1. Discuss gardens. Ask students to think about gardens. Share student experiences with gardens (what they have seen or already know about gardens). Ask them what constitutes a garden. Chart their responses.

2. Introduce the **terrarium**. Explain to the students that they will work in collaborative groups to set up a mini-garden, or terrarium. Show them the plastic terrarium container they will be using during their investigation.
3. Introduce the term **organism**. Ask for examples and list examples on chart paper where students can see them. Tell students an organism is any living thing, including plants or animals. Ask them about any plant or animal organisms that are familiar to them.
4. Introduce the plants by showing the students the different kinds of seeds that they can plant (corn, barley, pea, radish, clover etc.). They should include at least 3 different kinds of seeds in their terrarium, with a maximum of eight of each kind, except the clover (one spoonful will suffice).
5. Distribute the seeds and instruct the students to observe each kind of seed and record their properties in their notebooks.
6. With their group, the students should discuss where they would like to plant their seeds in the terrarium. In their science notebooks, students should include a detailed sketch of where the seeds will go in the terrarium. This is known as a terrarium map. **NOTE:** It is helpful if students create a key for each type of seed planted.
7. Label the front of the terrarium with a sticky note so that students know what seeds they are observing on a day to day basis. Group names should also be affixed to the terrarium.
8. Distribute the pebbles, 1 liter of soil, and 100mL of water to each group to use in the planting. Create a layer of pebbles at the base of the terrarium. This will help the water drain in the terrarium. Next, instruct them to plant their seeds, using all of the soil, according to their terrarium map. They may use as much water as they feel necessary, however, they must record the amount of water placed in the terrarium.
9. Instruct the students to place the cover on the terrarium. Plastic wrap can be used first if the lid has holes on it. They may then place these in a safe place preferably by a sunny window.

10. Call the students to the carpet area and discuss how each group planted their seeds in their terrariums. Refer back to their map in their science notebooks. Introduce the concept of **environment** to the students. List all of the parts of the terrarium system on chart paper using the student's ideas. Compare their terrarium to their environment. Record similarities and differences.

Lesson Two

1. Invite the students to the carpet area to review terrariums and the concept of environment. Explain that they will be observing their terrariums over the next two weeks (every 2-3 days) and recording any changes. Encourage them to create a sketch to go along with their description in their science notebooks. Discuss the possibility of mold growing in their terrarium. If this occurs, they must replant their terrarium after properly cleaning it with a bleach water solution. **NOTE:** Prewashing the terrariums in bleach water will significantly cut down on mold growing in the environment.
2. While the students are observing their terrariums ask them to take note of the sides of the terrarium, what the soil looks like, if they notice any growth (**germination**) from the seeds they planted, and any changes to the terrarium due to the growth of the plants.
3. Instruct the students to maintain and adjust their terrariums accordingly. If they think they need to add water, add water but record all changes made to the terrariums.
4. After the two weeks, discuss the progress of the terrarium and the plants growing inside. Once each group has reported out. Ask them to think about what changes they would make if they were planting a new terrarium and why.

Lesson Three

1. Start the lesson by telling the students that today they will be introducing an insect into their terrarium. Because they are investigating with a live organism, they must respect the organism and ensure its safety. Discuss animal care with students by

recording their ideas and leaving posted in a visible place in the classroom. **NOTE:** Check your district safety manual for insects that are allowed to be introduced into the classroom.

2. Distribute the insects (5 per group) in clear plastic cups. Instruct the students to observe the animals using their hand lenses. Remind them to record their observations in their science notebook, including a sketch of the insect.
3. Gather the students together and discuss their observations and sketches. Ask them how many legs they observed. What other structures did they notice? Did they observe any sounds from the organism?
4. Post a large picture of the body structure of your insect. Ask the students to compare their picture to yours. Go through and label each structure with their vocabulary first. Depending on the insect that you use, you may have antennae, jaws, pinchers, legs, wings, eyes, etc. After you label with the students' terms, introduce the appropriate vocabulary for each structure. A helpful site to find the body parts of the insect you are using in the investigation can be found at: <http://www.kendall-bioresearch.co.uk/morph.htm>.
5. Once the insects have been thoroughly observed, introduce them into the terrarium.
6. Invite them back to the group area and read aloud a book about your insect. Before reading, ask the students to think about the environment that this insect lives. They should be listening for clues in the book to what a suitable environment is for the insect.
7. Close the lesson by discussing what they learned about the insect's environment. Record the students' responses and further questions on chart paper and post.

Lesson Four

1. Invite the students to the carpet area to review terrariums and the new organism that was introduced into the environment. Explain that they will be observing their insects in the terrarium over the next two weeks (every day) and recording any changes.

Encourage them to create a sketch to go along with their description in their science notebooks.

2. While the students are observing their terrariums (looking specifically at the insects) ask them to take note of the behavior of the insects. Do they respond to light? Heat? What are they eating? Where are they located when you observe?
3. Instruct the students to maintain and adjust their terrariums accordingly by misting with water every few days when they seem to be drying out.
4. After one week, challenge them to add elements to their terrarium that they think might help the organisms inside **thrive**. They must base their decision on evidence collected during their observations.
5. Instruct them to introduce these new factors to the environment. They will continue to observe and record changes for 1 week. Keep a class terrarium unchanged as a control for the students to use to compare their terrarium.
6. After the two weeks, discuss the progress of the terrarium and the plants and insects growing inside. Once each group has reported out ask them to think about what changes they made that were successful and what they changed that had a negative effect. How do they know? Record the students final thoughts and ideas.

Additional Resources

<http://www.fossweb.com/modules3-6/Environments/index.html>

This interactive site takes students thorough the concept of environments.

<http://www.stormthecastle.com/terrarium/>

Information on how to build a terrarium.

<http://www.instructorweb.com/lesson/maketerrarium.asp>

Lesson plan on how to build and maintain a terrarium.

Suzuki, D. *Looking at the Environment*. John Wiley and Sons, 1991

ISBN: 0-471-54051-X

Hosoume, K., Barber, J., *Terrarium Habitats*. Lawrence Hall of Science, Great Explorations in Math and Science, 2001

ISBN: 0-924-88651-X

Vocabulary

Environment: Everything that surrounds and influences an organism.

Environmental factor: One part of the environment. An environmental factor can be nonliving, such as water, light, temperature, or chemicals, or living, such as a plant or an animal.

Germinate: When a seed sprouts, or starts to grow and develop.

Organism: Any living thing, including all plants and animals.

Terrarium: A mini-garden in an enclosed container.

Thrive: To grow and be healthy.

Variable: Something that can be changed.

Safety Reminder

Students must wash their hands after handling any animal.

Nevada State Science Standards

L5B1 Students know plants and animals have structures that enable them to grow, reproduce, and survive. E/S

L5C2 Students know organisms interact with each other and with the non-living parts of their ecosystem. E/S

L5C3 Students know changes to an environment can be beneficial or detrimental to different organisms. E/S

L5C4 Students know all organisms, including humans, can cause changes in their environments. E/S

L5D1 Students know animals and plants can be classified according to their observable characteristics. E/S

N5A1 Students know scientific progress is made by conducting careful investigations, recording data, and communicating the results in an accurate method. E/S

N5B3 Students know the benefits of working with a team and sharing findings. E/L